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ABSTRACT

This paper outlines recommended test-taking strategies for the self-sufficient learner based on research in cognitive psychology. The theoretical model used is the information-processing approach involving the three essential steps of paying attention, encoding, and framing associative linkages for the new material. Preparing for examinations is presented as the first hurdle. It is suggested that students keep up with the class by reading, attending lectures, and taking notes. Two research-recommended activities that appear to be very helpful in preparing for an examination are discussed: reviewing rather than cramming, and finding out the exact kind of test to expect. Different review strategies are examined in terms of the information processing model. A four-step plan for taking a test is suggested which involves going through the test four times, with four different purposes. It is noted that test-wise learners, those who have acquired the cognitive abilities to do well on a test independent of the subjective test content, use an organized approach to taking both multiple-choice and essay tests that reduces anxiety and maximizes the chances for optimum performance. Contributions from cognitive psychology are presented which include general instructions for working through a test as well as more specific advice. Instructors are encouraged to teach the kinds of techniques and strategies discussed in this paper in order to help their students become test-wise, self-sufficient learners. (NB)

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Test-Taking Strategies and the Self-Sufficient Learner

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Tests traditionally strike fear in students' hearts. However there are some students who are more successful on exams than others. These students have been called test-wise because they have acquired the cognitive abilities to do well on a test independent of their knowledge of the subjective test content (Sarnacki, 1979).

My presentation will outline recommended test-taking strategies for the self-sufficient learner based on research in cognitive psychology. The theoretical model utilized will be the information-processing approach involving the three essential steps of paying attention, encoding, and forming associative linkages for the new material.

Preparing for exams is the first hurdle. Students who have kept up with the required reading and who have taken notes in their own words have probably paid attention to, encoded, and formed meaningful associations for the assigned material. If the student has faithfully attended class lectures and discussions and taken a complete set of lecture notes, then the effort involved in writing down in their own words what they heard should have encouraged meaningful encoding of the material.

Assuming the student has been keeping up with the class reasonably well all along, there are two important activities,supported by research evidence, that appear to be very helpful in the last few days of preparation before an exam. These activities include reviewing rather than cramming, and finding out the exact kind of test to expect.

The studies on note taking are unanimous in finding that students who are allowed to review their notes before an exam recall more material (e.g., Knight & McKelvie, 1986). In fact, if there is one thing that is

clear from the existing literature on study techniques as well as on learning in general, it is: Review of previously learned material leads to increased learning and decreases the amount of forgetting. Cramming, however, is a different story because it involves attempting to master a great deal of new material immediately before an exam.

Beginning with the curve of forgetting established by Ebbinghaus (1913) and supported by subsequent research, the same principle has been supported. Forgetting takes place most rapidly immediately after learning and then declines more slowly. Ebbinghaus, working with nonsense syllables, found that 42% of forgetting took place after 20 minutes, 56% after 60 minutes, 64% after 9 hours, 66% after 24 hours, 75% after 6 days, and 79% after 31 days.

How can students avoid or at least reduce the ravages of this very large amount of forgetting, and remember what they have learned over a long-term period of weeks, months, or even years? The answer seems to lie in spaced reviews of previously learned material over a period of time rather than massed reviews of familiar material coming all about the same time, or, even worse, last-minute cramming of new material. (Austin, 1932; Lyon, 1912; Rothkopf & Coke, 1963).

Our model of verbal learning explains the superiority of spaced review over massed review, and the superiority of both techniques over cramming (Annis, 1983). All three techniques require the student to pay attention to the material. However, in the case of cramming, the student is not likely to have the time or take the time to meaningfully process the words by translating them into internal or external speech and then bringing to

mind the meanings of words. It is even less likely that the student will be able to form the essential associative linkages between the new material and what they already know. The superiority of spaced reviews over massed reviews is explained in terms of the encoding and associative linkages that receive greater reinforcement with spaced reviews. Since the student goes over the material more times, the encoding and linkages do not fade.

The second research-recommended activity for students in the last few days before an exam is to find out the kind of test they will be taking. Studies indicate that students perform better on the kind of retention test that they have been led to expect. For example, it was found that students who organized material in anticipation of an essay test performed better on the essay exam than students who prepared for a multiple-choice exam but actually took an essay exam (Tversky, 1973). The results of a recent study (Foos & Clark, 1984) suggest that it is best to study for an essay test if the student does not know what kind of test to expect. Foos and Clark speculate that when students prepare for an essay that they take an "broader focus," trying to integrate the facts into a larger context which in turn aids the recall of the specifics required to answer multiple-choice questions.

The self-sufficient learner also is able to use an organized approach to taking both multiple-choice and essay tests. Use of this method maximizes the chances for optimum performance as well as reduces anxiety. None of what I will suggest in the following section is in any way a

substitute for hard work and study, and should only be used after direct knowledge and reasoning fail to produce an answer. But no matter how thoroughly the student has learned the material, they still need to know how to take the test in an organized, efficient way, that is, they need to have test-wiseness.

The four-step plan for taking an exam that I am going to suggest is based on the suggestions provided by McKeachie (1986, pp. 94-97) and by Annis (1983). This recommended method for taking an exam involves going through the exam four times because each time through the test has a different purpose. Putting all four purposes together helps to eliminate possible sources of error. It is also probable, but not empirically proven as far as I know, that the use of this organized approach to test taking reduces the kind of debilitating anxiety that interferes with test performance (e.g., Alpert & Haber, 1960).

This is the four step plan to be recommended to students:

1. The first time through, you should move through the exam quickly, answering all questions about which you are fairly certain. This first time through the exam serves two functions. First, by going through the exam quickly, you can get a fairly large part of it completed without spending too much of the testing time. Second, it is highly likely that by going through the exam quickly you will remember or become aware of answers to questions that you would not otherwise remember. For example, something in question 50 will remind you of or give you the answer to question 15. By going through the test quickly the first time through, you become familiar with its entire content. In order to save time for the remaining three times through the test, it is important to use no more than half of the total time for this step. It is a good idea to wear your watch to exams and to keep track of the time as you proceed through the exam.

2. The second time through the test is very brief because all you do is go down the test answering those questions you were reminded of or now remember. If you are well prepared, you should now have answered a large part of the exam already, but, no matter how prepared you are, there will still be some unanswered questions. This is where the third step comes in.

3. The purpose of the third time through the exam is to complete the entire test. Two rules of thumb are useful here. The general underlying principle of these two rules is that you should never ever simply guess, that is, close your eyes and point to the right answer. There are many more effective techniques to use. First, you should attempt to eliminate some of the options as incorrect. If there are four options to a question and you have to purely guess, there is only a 25% (1 out of 4) chance of getting it right. If you can eliminate one option as wrong and then still have to guess, the chances are 33 1/3% (or 1 out of 3) of getting it right. If two options can be eliminated, the chances of getting it right by guessing have improved to 50% (1 out of 2). Thus you should take advantage of the mathematics of the situation.

   Second, if you have eliminated some of the options as incorrect but still do not know the correct answer, there are still better ways to answer the question than through pure guesswork. Assume that you are a student unfamiliar with American history and are faced with this question that you are not able to answer the first or second time through the exam.

   Who was the first President of the United States?
   a. Thomas Jefferson
   b. George Washington
   c. Donald Duck
   d. Al Capone

   Using the first rule of thumb discussed above, you should eliminate any options that you know are wrong rather than simply guess. It will be assumed that you are able to eliminate option 3 because you are familiar with cartoon characters, and you are able to eliminate option 4 because you know about famous gangsters. Now your chances of getting the question right through purely guessing which alternative is correct have improved to 50%. Options 3 and 4 may appear absurd, but in many actual test questions one or two of the options may be no more ridiculous in their context that options 3 and 4, therefore, they can easily be eliminated.

> Now you are down to two options and this is where the second rule of thumb becomes helpful. First, you can choose the answer that you initially thought of as being correct, unless upon your further evaluation and reading of the test you have now come up with a good reason why the answer that you first selected as correct is really incorrect. If you never had any notion at all of the correct answer, then you are advised to choose the second option if you have not already eliminated it. Note that the example above was "rigged" to illustrate the value of this rule of thumb! However, it is not just wild advise to choose the second option because it can be justified for two basic reasons. First, it gives you a rule of thumb that you can use to answer questions when you have no notion of the correct answer. This helps to eliminate the anxiety that results from trial-and-error behavior in such cases. Second, there is sometimes a tendency on the part of the test maker in listing the choices to make the first choice a seductive alternative and the second choice the right answer.

It is also at this point in test taking that utilizing the "Taxonomy of Test-Wiseness Principles," provided by Millman, Bishop, and Ebel (1965) and discussed by Sarnacki (1979) should prove helpful. This Taxonomy is divided into Part I "Elements independent of test constructor or test purpose" and has sections on time-using strategy, error avoidance strategy, guessing strategy, and deductive reasoning strategy. Many of these empirically-supported strategies have been incorporated into the four-step plan for test-taking that is presented here.

However Part II of the Taxonomy entitled "Elements dependent upon the test constructor or purpose" includes many other useful empirically supported suggestions for test-taking under the categories of intent consideration strategy and cue-using strategy. Specific suggestions include consider the relevance of specific detail when answering an item, and recognize and make use of any consistent idiosyncracies of

the test constructor which distinguish the correct answer from incorrect options. These idiosyncracies include the tendency to make the correct answer longer (or shorter) than the incorrect option, or the tendency to include more false (or true) statements.

4. By the end of the third time through the test, you should have answered all questions. This is where some students give up (or run out of time if they have not watched the time carefully), but if you are willing to hang in there and go through the test the fourth time through, you are most likely to maximize your score. It is recommended that you go through the exam completely again to double-check the questions to make certain that they still read the way they first appeared to, to check your answers to make certain that they are the ones that you still think are correct, and to make certain you made no clerical errors in filling out the answer sheet. This is the time you will most likely catch the "dumb" mistakes that you are likely to kick yourself for later, for example, missing the not in a question, or mentally reading in a not that is not really there. Probably the best way to go through the test the fourth time is to cover up the answer sheet with your hand or a blank sheet of paper and reread each question. Mentally determine the answer once again, then uncover the answer sheet to see if this was the answer that you previously recorded. If so, you have double assurance that your answer is correct. If not, you need to rethink the question and correct answer.

   One further point should be noted here. There is a common misperception among students that they should never change answers because they usually change them from right to wrong. However, several studies have revealed that students are significantly more likely to change their answers from wrong to right than from right to wrong. (Mueller & Wasser, 1977; Vidler & Hansen, 1980).

There is a great deal of evidence that students differ greatly in the amount of test-wiseness that they possess (e.g., Gibb, 1964). In practice, this means that students who already have developed an organized approach for taking a test such as the one just discussed and students who can take advantage of secondary cues on flawed tests

have a definite advantage in taking tests over low-wise individuals who are penalized for lack of such abilities. As Ebel (1972) has pointed out, "error of measurement is likely to be due to too little, rather than too much, test-wiseness" (p. 237). McKeachie (1986) suggests that all instructors include in their courses an orientation lecture about test-taking like the kind I have described here if they wish to eliminate test-wiseness as a source of variation.

As we have seen, cognitive psychology in particular and educational research in general have much to offer students reqarding test-taking strategies. If we as instructors wish to help our students become self-sufficient learners, it becomes our responsibility to help them become more test-wise by teaching the kinds of techniques and strategies discussed here.

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